CLAIMS

1. A piezo-electric tag (10) including receiving means (20, 30) for receiving input radiation and generating a corresponding received signal, piezo-electric vibrating means (40, 50) for increasing voltage magnitude of the received signal to generate a supply potential and electronic circuit means (60) powerable by the supply potential.

2. A tag according to Claim 1 wherein the vibrating means (30, 40) comprises a piezo-electric transformer (40) incorporating mutually vibrationally coupled primary and secondary regions (42, 44), the transformer (40) operable to be excited into vibration by the received signal at the primary region (42) and to generate a corresponding output signal at the secondary region (44) for use in generating the supply potential.

3. A tag according to Claim 1 wherein the vibrating means (40) comprises a piezo-electric bi-morph operable to be excited into vibration by the received signal and to generate a corresponding output signal for use in generating the supply potential.

4. A tag according to Claim 1 wherein the vibrating means comprises a silicon micromachined device comprising an array of one or more resonant elements, each element incorporating an associated piezo-electric transducer operable to generate an element signal in response to vibration of its associated element, the transducers connected in series to add their element signals to provide an overall output from which the supply potential is generated, and driving means operable to be driven by

the received signal for stimulating the one or more elements into vibration and thereby generating the supply potential.

5. A tag according to Claim 4 wherein the resonant elements are operable at resonance to generate the supply potential.

6. A tag according to Claim 4 or 5 wherein the resonant elements are housed in an evacuated environment for increasing their resonance Q factor.

7. A tag according to any one of Claims 1 to 6 wherein the receiving means incorporates demodulating means (30) for demodulating modulation components present in the received radiation to generate the received signal.

8. A tag according to Claim 7 wherein the demodulating means (30) incorporates zero-bias Schottky diodes for demodulating the received radiation to generate the received signal.

9. A tag according to Claim 7 wherein the demodulating means incorporates transistors operable as synchronous demodulators for demodulating the received signal to generate the received signal.

10. A tag according to any preceding claim wherein the circuit means is operable to function in a class C mode for reducing tag power consumption.

11. A tag according to any one of Claims 1 to 10 wherein the receiving means (20, 310) incorporates first and second antennae (20, 310) for generating the received signal for exciting the vibrating means (40), the first antenna adapted (20) to respond to microwave radiation and the second antenna (310) adapted to respond to radiation having a carrier frequency corresponding to a resonant frequency of the vibrating means (40).

12. A tag according to any one of Claims 1 to 11 wherein the receiving means (20, 310, 410, 430) incorporates at least one of a metallic film dipole antenna, a loop antenna and a patch antenna for one or more of receiving and emitting radiation.

13. A tag according to any one or Claims 1 to 12 wherein the circuit means comprises responding means (64, 68, 70; 420, 430; 510, 520, 530) for emitting output radiation from the tag (10; 400; 500), the responding means powerable by the supply potential.

14. A tag according to Claim 13 wherein the vibrating means is operable to recover a clock component of Manchester bi-phase encoded radiation received at the tag and the responding means is operable to use the clock component to demodulate the encoded radiation to generate corresponding demodulated data for use in the tag.

15. A tag according to Claim 13 wherein the tag incorporates two antennae(20, 64), one antenna (20) for use in generating the received signal and the other (64) incorporated into the responding means (60) for at least one of emitting and receiving radiation.

16. A tag according to Claim 13 wherein the antennae are conductive metallic film dipole

antennae.

17. A tag according to any preceding claim in the form of a block.

18. A tag according to any one or Claims 1 to 16 in the form of a planar card (Fig. 2).

19. A tag according to Claim 18 wherein the card incorporates recesses (230, 240, 250, 260) for accommodating the receiving means, the vibrating means and the responding means.

20. A tag according to Claims 13 wherein the responding means is a transponder operable to receive input radiation to the tag and emit output radiation in response from the tag.

21. A tag according to Claim 20 wherein the transponder is operable to modulate the output radiation with a signature code by which the tag can be individually identified.

22. A tag (10) according to Claim 20 or 21 wherein the transponder incorporates a reflection amplifier (70) for amplifying the input radiation to generate the output radiation.

23. A tag (10) according to Claim 20, 21 or 22 wherein the transponder is operable in a pseudo-continuous mode and incorporates a delay line (68) for delaying the output radiation relative to the input radiation, thereby counteracting spontaneous oscillation from arising within the transponder from feedback therein.

24. A tag according to any preceding claim incorporating a metallic earthing plane for providing a common signal earth for the tag.

25. A tag according to any preceding claim adapted for implantation into a biological system and operable to at least one of monitor and stimulate the biological system.

26. A method of guiding vehicles along a path to a destination, the method comprising the steps of:

(a) distributing a plurality of tags according to any one of Claims 1 to 24 along the path and providing the vehicle with a direction sensitive interrogating source adapted to transpond with the tags;

(b) interrogating the tags from the source by emitting radiation to the tags and receiving radiation therefrom, thereby determining direction of the tags relative to the source and hence determining the path;

(c) moving the vehicle along the path; and

(d) repeating steps (b) and (c) until the vehicle reaches the destination.

27. A silicon micromachined device for receiving an input signal and generating a corresponding voltage magnitude enhanced output signal therefrom , the device comprising an array of one or more resonant elements, each element incorporating an associated piezo-electric transducer operable to generate an element signal in response to vibration of its associated element, the transducers connected in series to add their element signals to provide the output signal, and driving means operable to

be driven by the input signal for stimulating the one or more elements into vibration and thereby generating the output signal.

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